Dispersion compensation in 40-Gb/s optical transmission by using coupled-cavity-type photonic crystals

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Dispersion compensation by photonic crystal coupled-cavity waveguides (PhC CCWs) was investigated experimentally, and we demonstrated for the first time that the PhC can compensate for dispersion in a 40-Gb/s non-return-to-zero optical transmission. In this experiment, we stacked ten one-dimensional CCWs, which consist of SiO_2/Ta_2O_5-thin films, and optical signals were transmitted into these CCWs three times [1]. As a result, a well-defined eye pattern was obtained at a distance of 4.5 km for a single-mode fiber (Fig. 1). However, it closed without the CCWs. This indicated that the CCWs compensated for a dispersion of more than 60 ps/nm. This result will enable a drastic downsizing in the dispersion compensator by PhC, compared with one used in conventional optical communication.

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[1] T. Fukamachi *et al*., PECS-V, Th-P26, p206 (2004).

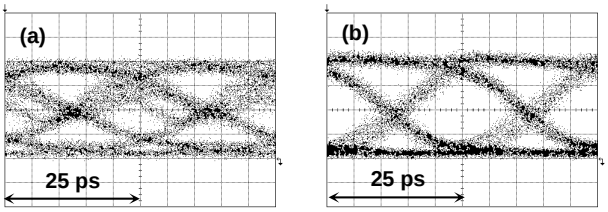

Fig. 1 Eye patterns (a) after transmission over the distance of 4.5 km and (b) after compensating for the dispersion.